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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/080,936	02/21/2002	Markus Lindemann	(MM) 54 199	6569

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EXAMINER

KOSOWSKI, ALEXANDER

ART UNIT PAPER NUMBER

2125

DATE MAILED: 05/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/080,936

Applicant(s)

LINDEMANN ET AL.

Examiner

Alexander J Kosowski

Art Unit

2125

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 February 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

- 1) Claims 1-23 are presented for examination.

Claim Objections

- 2) Claim 2 is objected to because of the following informalities:

Referring to claim 2, line 3, the word "power" should read --powder--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

- 3) The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

- 4) Regarding claims 6 and 18, the phrase "preferably" renders the claims indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 102

- 5) The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

- 6) Claims 1, 3 and 9 are rejected under 35 U.S.C. 102(b) as being unpatentable by Deckard (U.S. Pat 5,017,753).

Referring to claim 1, Deckard teaches a process for producing a shaped body by selective laser melting (col. 2 lines 50-53), in which a shaped body is built up from pulverulent metallic material using CAD data of a model (col. 2 lines 65-67), comprising the following steps:

Art Unit: 2125

applying a powder layer using an applicator unit (col. 2 lines 53-54), fixing the applied powder layer to a layer below it using a focused laser beam (col. 2 lines 54-57), applying the powder layer selectively by the applicator unit to regions of a surface of the shaped body that lie below or adjoin a plane that is defined by a predetermined layer thickness for a next powder layer that is to be processed (col. 4 lines 5-17).

Referring to claim 3, Deckard teaches the process according to claim 1, wherein the applicator unit is positioned above the surface of or passes over the shaped body one or more times (col. 4 lines 5-17).

Referring to claim 9, Deckard teaches a device for producing a shaped body by selective laser melting for carrying out the process according to claim 1, comprising a process chamber comprising a build-up chamber for the shaped body (Figures 10 and 11, whereby the components would be held in a chamber to eliminate contamination), an applicator unit that, after the shaped body has been positioned, applies a layer of powder a next desired layer thickness, when positioned above the shaped body or passed over the shaped body at least once, wherein the applicator unit has selecting means for the selective application of the powder layer (col. 4 lines 5-17).

Claim Rejections - 35 USC § 103

7) The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2125

8) Claims 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deckard (U.S. Pat 5,017,753).

Referring to claim 4, Deckard teaches the process according to claim 1, wherein the powder layer is levelled to a desired layer thickness as a result of a levelling device being positioned at least once above the shaped body or as a result of a levelling device passing over the shaped body at least once (col. 4 lines 5-17 and col. 6 lines 38-43). However, Deckard does not explicitly teach that projecting sections of the layer which was melted last using the laser beam which project above the desired layer thickness of the applied powder are uncovered by the levelling device.

Examiner notes that it would have been obvious to one skilled in the art at the time the invention was made to allow projecting sections of the last melted layer which project above the desired layer thickness of the applied powder to be uncovered by the leveling device in the invention taught by Deckard since a smooth layer of powder is to be distributed in the target area which includes both sintered and unsintered particles (Deckard, col. 9 lines 49-53) and the uneven sintered particles would be forced above the applied powder layer due to differences in thickness.

Referring to claim 5, Deckard teaches the process according to claim 4, wherein the laser beam is guided over a predetermined area of the material-powder layer in a plurality of tracks, and the material powder applied is melted at the point of incidence of the laser beam, and the projecting sections lying in the predetermined areas are at least partly melted and integrated with the adjoining melted powder layer (col. 3 lines 6-20 and lines 37-57).

Art Unit: 2125

Referring to claim 6, Deckard teaches the process according to claim 4, wherein the levelling device passes over the shaped body at least twice, and preferably three times, in order to level the material powder to be applied (col. 4 lines 5-17 and col. 6 lines 38-43).

Referring to claim 7, Deckard teaches the process according to claim 4, wherein the material powder which is applied to the shaped body by the applicator unit is immediately afterwards levelled to the desired height by the levelling device (col. 4 lines 5-17 and col. 6 lines 38-43).

Referring to claim 8, Deckard teaches the process according to claim 7, wherein the applicator unit is coupled to the levelling device for the application and leveling (col. 4 lines 5-17).

9) Claims 10-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deckard, further in view of Penn (U.S. Pat 5,260,009).

Referring to claim 10, Deckard teaches the device according to claim 9, comprising at least one levelling device that levels the powder layer down to the desired layer thickness (col. 4 lines 5-17). However, Deckard does not explicitly teach that the leveling devices comprises individual elements that pull off the powder to uncover the projecting sections of the layer below that project above the desired layer thickness.

Penn teaches that it is well known to use a rolling brush to deposit and level powders in a laser sintering system (col. 2 lines 9-21).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize a brush comprising individual elements that pull off powder in the invention

Art Unit: 2125

taught by Deckard since a rolling brush is a well known alternative to a drum roller as is taught by Deckard.

In addition, examiner notes that it would have been obvious to one skilled in the art at the time the invention was made to allow projecting sections of the last melted layer which project above the desired layer thickness of the applied powder to be uncovered by the leveling device in the invention taught by Deckard since a smooth layer of powder is to be distributed in the target area which includes both sintered and unsintered particles (Deckard, col. 9 lines 49-53) and the uneven sintered particles would be forced above the applied powder layer due to differences in thickness.

Referring to claims 11-19, Deckard does not explicitly teach that the levelling device has at least one row of individual elements that can be deflected when passing over projecting sections, that the individual elements of the levelling device comprise free ends that lie in a common plane, that the levelling device is comprised as a brush, that the levelling device comprises a plurality of bristles that lie in a row and has at least two rows for bristles, that the bristles are of metallic form, that the levelling device has bristles which lie close together, that the individual elements of the levelling device comprise a lip with at least one row of small plates, that the individual elements are produced from a thin sheet-metal layer, preferably by laser cutting, nor that the small plates are arranged adjacent to one another by fine cut lines.

Penn teaches that it is well known to use a rolling brush to deposit and level powders in a laser sintering system (col. 2 lines 9-21).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize all of the claim limitations of claims 11-19 in the invention taught by

Art Unit: 2125

Deckard since the brush taught by Penn would be composed of bristles which are capable of being deflected, could have multiple rows of bristles made of any material, could have bristles that lie close together, and a brush may be composed of a thin sheet-metal layer of fine cut lines with a lip and rows of plates. All of these limitations are commonly associated with a brush and its corresponding bristles made of multiple materials, and could be implemented as an applicator as taught by Penn.

Referring to claims 20-21, Deckard teaches the invention above. However, Deckard does not explicitly teaches that the levelling device has individual elements that are arranged in such a manner that they are deflected by means of an articulated joint, nor that the individual elements comprise a damping element on at least one side close to the articulated joint.

Penn teaches that it is well known to use a rolling brush to deposit and level powders in a laser sintering system (col. 2 lines 9-21).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the limitation of claims 20-21 in the invention taught by Deckard since a brush may be defined as having individual elements deflectable by means of an articulated joint, and since any brush made of, for instance, thin metal bristles, would inherently have a damping property associated with each articulated joint.

10) Claims 2 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deckard, further in view of Mazumder (U.S. PGPUB 2002/0065573).

Referring to claim 2, Deckard teaches the invention above. However, Deckard does not explicitly teach the process according to claim 1, further comprising the steps of: recording areas

that lie below or adjacent to a plane of the predetermined layer thickness for the next powder layer to be processed by means of a device, and applying the material powder in finely defined form in those areas.

Mazumder teaches a powder applicator unit for a laser sintering device whereby the size and the quantity of powder which can be discharged is limited and controllable to specific defined areas (Paragraphs 0023 and 0030).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize determine areas of differing thickness and apply material in those areas specifically in the invention taught by Deckard since this would allow for increased powder utilization and better thermal management (Mazumder, Paragraph 0030), and since this would increase the smoothness of the resulting object.

Referring to claims 22-23, Deckard teaches the invention above. However, Deckard does not explicitly teach that the applicator unit comprise at least one scanning element with a closure section that interacts with an opening in the applicator unit and opens or closes the opening in the applicator unit as a function of a size of a projecting section, nor that the scanning element comprises a middle area which, irrespective of a position of the closure section in the opening, interacts with a further section of the opening and limits the maximum quantity of powder which can be discharged.

Mazumder teaches a powder applicator unit for a laser sintering device whereby the size of a projecting section of powder and the quantity of powder which can be discharged is limited and controllable (Paragraphs 0023 and 0030).

Art Unit: 2125

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to utilize the limitations of claims 22-23 in the invention taught by Deckard since this would allow for increased powder utilization and better thermal management (Mazumder, Paragraph 0030).

Conclusion

11) The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Hammeke (U.S. Pat 4,724,299) – teaches a laser spray nozzle.

Kar et al (U.S. Pat 6,526,327) – teaches a rapid manufacturing system.

Koch et al (U.S. pat 6,122,564) – teaches a multi-laser cladding system.

Mazumder (U.S. Pat 6,580,959) – teaches a system for direct material deposition.

Langer et al (U.S. Pat 5,582,876) – teaches a stereographic appartatus.

Langer et al (U.S. Pat 5,460,758) – teaches an apparatus for producing 3D objects.

McAlea et al (U.S. Pat 5,817,206) – teaches selective laser sintering.

Kumar (U.S. Pat 6,066,285) – teaches solid freeform fabrication.

Tseng (U.S. pat 6,372,178) – teaches freeform fabrication of 3D objects.

12) Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander J Kosowski whose telephone number is 703-305-3958.

The examiner can normally be reached on Monday through Friday, alternating Fridays.

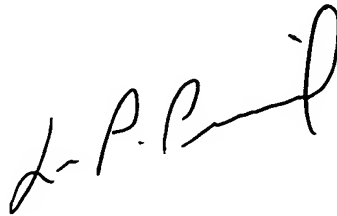
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard can be reached on 703-308-0538. The fax phone number for the

Art Unit: 2125

organization where this application or proceeding is assigned is (703) 872-9306. In addition, the examiner's RightFAX number is 703-746-8370.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Alexander J. Kosowski
Patent Examiner
Art Unit 2125

A handwritten signature in black ink, appearing to read 'L. Picard', written in a cursive style.

**LEO PICARD
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100**